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## SEQUENCE LISTING

<110> Melbourne Health  
 Southern Health  
 5 Austin Health  
 St. Vincent's Hospital (Melbourne) Ltd. trading as St. Vincent's  
 Hospital Melbourne  
 Bayside Health  
 BARTHOLOMEUSZ, Angeline, Ingrid (US Only)  
 10 LOCARNINI, Stephen, Alister (US Only)  
 AYRES, Anna (US Only)  
 YUEN, Lilly, Ka, Wai (US Only)  
 SASADEUSZ, Joseph, John (US Only)

15 <120> Viral Variants; Detection and Application  
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 <150> AU2003905776  
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 <151> 2004-02-25

25 <160> 42  
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 <213> hepatitis B virus

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 15 <212> PRT  
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 25 20 25 30  
 Asn Pro His Asn Thr Lys Glu Ser Arg Leu Val Val Asp Phe Ser Gln  
 30 35 40 45  
 Phe Ser Arg Gly Ser Thr His Val Ser Trp Pro Lys Phe Ala Val Pro  
 50 55 60  
 35 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu  
 65 70 75 80  
 40 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala  
 85 90 95  
 45 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val  
 100 105 110  
 Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln His Gly Thr  
 115 120 125  
 50 Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu  
 130 135 140  
 55 Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His  
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15	Arg	Ala	Phe	Pro	His	Cys	Leu	Ala	Phe	Ser	Tyr	Met	Asp	Asp	Val	Val
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20	Leu	Gly	Ala	Lys	Ser	Val	Gln	His	Leu	Glu	Ser	Leu	Tyr	Thr	Ala	Ile
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30	Lys	Arg	Trp	Gly	Tyr	Ser	Leu	Asn	Phe	Met	Gly	Tyr	Val	Ile	Gly	Ser
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60	Asp	Ser	Trp	Trp	Thr	Ser	Leu	Asn	Phe	Leu	Gly	Gly	Ala	Pro	Thr	Cys
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65	Pro	Gly	Gln	Asn	Leu	Gln	Ser	Pro	Thr	Ser	Asn	His	Ser	Pro	Thr	Ser
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 10 gtatccctcc tgttgctgta ccaaaccctt ggacggaaat tgcacctgta ttcccatccc 660  
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25 <210> 5  
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 <212> PRT  
 <213> hepatitis B virus

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 35 40 45  
 45 Phe Ser Arg Gly Asn Tyr Arg Val Ser Trp Pro Lys Phe Ala Val Pro  
 50 55 60  
 50 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu  
 65 70 75 80  
 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala  
 85 90 95  
 55 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr Val  
 100 105 110

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15	Leu	Leu	Leu	Tyr	Gln	Thr	Phe	Gly	Arg	Lys	Leu	His	Leu	Tyr	Ser	His
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45	Lys	Arg	Trp	Gly	His	Ser	Leu	His	Phe	Met	Gly	Tyr	Val	Ile	Gly	Cys
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50	Tyr	Gly	Ser	Leu	Pro	Gln	Asp	His	Ile	Arg	Gln	Lys				
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Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Thr Thr Val Cys  
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5 Leu Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser  
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10 Cys Pro Pro Thr Cys Pro Gly Tyr Arg Trp Met Tyr Leu Arg Arg Phe  
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15 Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val  
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30 Gln Gly Asn Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp  
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35 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys  
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45 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu  
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50 Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Arg Ile  
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Tyr Ile  
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 <213> hepatitis B virus

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 15 ccccaacctc caatcactca ccaacctctt gtctccaat ttgtcctggg tatcgtctga 480  
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 20 ggggtcttct ggactaccaa ggtatgttgc ccgtttgtcc tctacttcca ggaacatcaa 600  
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 40 <211> 271  
 <212> PRT  
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 55 Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp Phe Ser Gln  
 35 40 45



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Phe Ser Arg Gly Asn Thr Gln Val Ser Trp Pro Lys Phe Ala Val Pro  
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5 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu  
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10 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala  
 85 90 95

15 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val  
 100 105 110

20 Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln His Gly Thr  
 115 120 125

25 Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu  
 130 135 140

30 Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His  
 145 150 155 160

35 Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser  
 165 170 175

40 Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg  
 180 185 190

45 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val  
 195 200 205

50 Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Phe Thr Ala Val  
 210 215 220

55 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Thr Lys Thr  
 225 230 235 240

Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser  
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20 Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Thr Pro Lys Cys  
 35 40 45

25 Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser  
 50 55 60

30 Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe  
 65 70 75 80

Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Trp Gly  
 85 90 95

35 Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly  
 100 105 110

40 Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Thr Pro Ala  
 115 120 125

45 Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp  
 130 135 140

50 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Arg  
 145 150 155 160

Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser Leu Leu  
 165 170 175

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Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu

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	Tyr Ile 225			
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 35 40 45

20 Phe Ser Arg Gly Ser Thr Arg Val Ser Trp Pro Lys Phe Ala Val Pro  
 50 55 60

25 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu  
 65 70 75 80

30 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala  
 85 90 95

Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val  
 100 105 110

35 Ala Arg Leu Ser Ser Thr Ser Arg Asn Val Asn Tyr Gln His Gly Thr  
 115 120 125

40 Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu  
 130 135 140

45 Met Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His  
 145 150 155 160

50 Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser  
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Pro Phe Leu Leu Thr Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg  
 180 185 190

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Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val

- 13 -

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 15    Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser  
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 50    Pro Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser  
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20	Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Xaa Leu Ser Leu Leu			
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		180	185	190
30	Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile			
		195	200	205
35	Leu Ser Pro Phe Ile Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val			
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40	Tyr Ile			
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 10 cagtgggttc tagggctttc cccactggtt tggttttcag ttatgtggat gatgtggat 780  
 tggggggcaa gtctgcacaa catcttgaat ccctttttac cgctattacc aattttcttt 840  
 tgtctttggg tatacattta aaccmtaata aaaccaaagc ttggggctat tcccttaact 900  
 15 ttatgggata tggaattgga agttggggtc ctgccaggg aagatggcag ggg 953

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 25 <222> (288)..(288)  
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 35 Ala Arg Ser Gln Ser Glu Gly Pro Ile Leu Ser Cys Trp Trp Leu Gln  
 20 25 30  
 40 Phe Arg Asn Ser Lys Pro Cys Ser Asp Tyr Cys Leu Ser His Ile Val  
 35 40 45  
 45 Asn Leu Leu Glu Asp Trp Gly Pro Cys Thr Glu Tyr Gly Glu His His  
 50 55 60  
 Ile Arg Ile Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu  
 65 70 75 80  
 50 Val Asp Lys Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp  
 85 90 95  
 55 Phe Ser Gln Phe Ser Arg Gly Ser Thr Arg Val Ser Trp Pro Lys Phe  
 100 105 110

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Ala Val Pro Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu  
 115 120 125

5 Ser Trp Leu Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu  
 130 135 140

10 His Pro Ala Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro  
 145 150 155 160

15 Arg Tyr Val Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln  
 165 170 175

20 His Gly Thr Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr  
 180 185 190

25 Val Ser Leu Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu  
 195 200 205

Tyr Ser His Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val  
 210 215 220

30 Gly Leu Ser Pro Phe Leu Met Ala Gln Phe Thr Ser Ala Ile Cys Ser  
 225 230 235 240

35 Val Val Arg Arg Ala Phe Pro His Cys Leu Val Phe Ser Tyr Val Asp  
 245 250 255

40 Asp Val Val Leu Gly Ala Lys Ser Ala Gln His Leu Glu Ser Leu Phe  
 260 265 270

Thr Ala Ile Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Xaa  
 275 280 285

45 Asn Lys Thr Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Gly  
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50 Ile Gly Ser Trp Gly  
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55 <210> 15  
 <211> 307  
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5 <223> Xaa is any amino acid

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20 Met Gln Trp Asn Ser Ser Thr Phe His Gln Ala Leu Leu Asp Pro Arg
    20          25          30
25 Val Arg Gly Leu Tyr Phe Pro Ala Gly Gly Ser Ser Ser Gly Thr Val
    35          40          45
30 Asn Pro Val Pro Thr Thr Ala Ser Pro Ile Ser Ser Ile Phe Ser Arg
    50          55          60
35 Thr Gly Asp Pro Ala Pro Asn Met Glu Ser Thr Thr Ser Gly Phe Leu
    65          70          75          80
40 Gly Pro Leu Leu Val Leu Gln Ala Gly Phe Phe Leu Leu Thr Arg Ile
    85          90          95
45 Leu Thr Ile Pro Gln Ser Leu Asp Ser Trp Trp Thr Ser Leu Asn Phe
    100          105          110
50 Leu Gly Gly Ala Pro Ala Cys Pro Gly Gln Asn Leu Gln Ser Pro Thr
    115          120          125
55 Ser Asn His Ser Leu Thr Ser Cys Pro Pro Ile Cys Pro Gly Tyr Arg
    130          135          140
    Trp Met Cys Leu Arg Arg Phe Ile Ile Phe Leu Phe Ile Leu Leu Leu
    145          150          155          160
60 Cys Leu Ile Phe Leu Leu Val Leu Leu Asp Tyr Gln Gly Met Leu Pro
    165          170          175

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5 Val Cys Pro Leu Leu Pro Gly Thr Ser Thr Thr Ser Thr Gly Pro Cys  
 180 185 190  
 Lys Thr Cys Thr Thr Pro Ala Gln Gly Thr Ser Met Phe Pro Ser Cys  
 195 200 205  
 10 Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys Thr Cys Ile Pro Ile Pro  
 210 215 220  
 15 Ser Ser Trp Ala Phe Ala Arg Phe Leu Trp Glu Trp Ala Ser Val Arg  
 225 230 235 240  
 20 Phe Ser Trp Leu Ser Leu Leu Val Pro Phe Val Gln Trp Phe Val Gly  
 245 250 255  
 25 Leu Ser Pro Thr Val Trp Phe Ser Val Met Trp Met Met Trp Tyr Trp  
 260 265 270  
 30 Gly Pro Ser Leu His Asn Ile Leu Asn Pro Phe Leu Pro Leu Leu Pro  
 275 280 285  
 Ile Phe Phe Cys Leu Trp Val Tyr Ile Xaa Thr Xaa Ile Lys Pro Asn  
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 35 Val Gly Ala  
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 <212> DNA  
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 50 ggggcctata ctttctgct ggtggctcca gttccggaac agtaaaccct gttccgacta 180  
 ctgcctctcc catatcgta atcttctcga ggactgggga ccctgcaccg aatatggaga 240  
 gcaccacatc aggattccta ggaccctgc tcgtgttaca ggcggggttt ttcttgttga 300  
 55 caagaatcct cacaatacca cagagtctag actogtggtg gacttctctc aattttctag 360  
 ggggagcacc cacgtgtcct ggccaaaatt tgcagtcccc aacctccaat cactcaccaa 420

- 19 -

cctcttgtcc tccaatttgt cctgggtatc gctggatgtg tctgcggcgt tttatcatct 480  
 5 tcctcttcat cctgctgcta tgcctcatct tcttggttgg tcttctggac taccaaggta 540  
 tgttgccogt ttgtcctcta cttccaggaa catcaactac cagcacggga ccatgcaaga 600  
 cctgcaagac tcctgctcaa ggaacctcta tgtttccctc ttgttgctgt acaaacctt 660  
 10 cggacggaaa ttgcacttgt attcccatcc catcatcttg ggctttcgca agattcctat 720  
 gggagtgggc ctcagtccgt ttctcctggc tcagtttact agtgccatth gttcagtgg 780  
 15 tcgtagggct ttccccact gtttggtttt cagttatatg gatgatgtgg tattgggggc 840  
 caagtctgta caacatcttg aatccctttt taccgctgtt accaattttc ttttgtcttt 900  
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 20 atatgtaatt ggaagttggg gtaccttg 988

<210> 17  
 <211> 258  
 25 <212> PRT  
 <213> hepatitis B virus

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30 Glu Asp Trp Gly Pro Cys Thr Glu Tyr Gly Glu His His Ile Arg Ile  
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35 Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys  
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40 Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp Phe Ser Gln  
 35 40 45

45 Phe Ser Arg Gly Ser Thr His Val Ser Trp Pro Lys Phe Ala Val Pro  
 50 55 60

50 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu  
 65 70 75 80

55 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala  
 85 90 95

55 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val  
 100 105 110

- 20 -

Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln His Gly Thr  
           115                                  120                                  125

5 Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu  
       130                                  135                                  140

10 Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His  
     145                                  150                                  155                                  160

15 Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser  
                                   165                                  170                                  175

Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg  
                                   180                                  185                                  190

20 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val  
                                   195                                  200                                  205

25 Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Phe Thr Ala Val  
       210                                  215                                  220

30 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Thr Lys Thr  
     225                                  230                                  235                                  240

35 Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser  
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Trp Gly

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     <212> PRT  
     <213> hepatitis B virus

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Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu  
                                   20                                  25                                  30

55 Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Ala Pro Thr Cys  
                                   35                                  40                                  45

- 21 -

5 Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser  
 50 55 60  
 10 Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe  
 65 70 75 80  
 15 Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val  
 85 90 95  
 20 Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Thr Pro Ala  
 115 120 125  
 25 Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp  
 130 135 140  
 30 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Arg  
 145 150 155 160  
 35 Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser Leu Leu  
 165 170 175  
 40 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu  
 180 185 190  
 45 Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile  
 195 200 205  
 50 Leu Asn Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val  
 210 215 220  
 Tyr Ile  
 225  
 55 <210> 19  
 <211> 1043  
 <212> DNA  
 <213> hepatitis B virus  
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 5 gcaagatccc agagtgaggg gcctgtatct ccctgctggt ggctccagtt caggaacagc 180  
 aaaccctggt ccgactactg cctctcgtt atcgtcaatc ttctcgagga ttggggaccc 240  
 tgcgctgaac atggagaaca tcacatcagg actcctagga ccccttctcg tggtacaggc 300  
 10 ggggtttttc ttgttgacaa gaatcctcac aataccgcag agtctagact cgtggtggac 360  
 ttctctcagt tttctagggg gaactaccgt gtgtcttggc caaaattcgc ggtccccaac 420  
 ctccaatcac tcaccaacct cctgtcctcc gacttgtcct gggtatcgtt ggatgtatct 480  
 15 ggggctgttt atcatattcc tcttcactct gctgctatgc ctcatcttct tggtggttct 540  
 tctggactat caaggtatgt tgcccgtttg tcctctaatt ccaggatcct caaccaccag 600  
 20 cacgggaaca tgccgaacct gcacgactcc tgctcaagga acctctatgt atccctcctg 660  
 ttgctgtacc aaaccttcgg acggaaattg cacctgtatt cccatcccat catcttgggc 720  
 25 tttcggaaaa ttcctatggg agtgggcctc agcccgtttc tcctggtcga gtttactagt 780  
 gccatttggt cagtgggttc tagggctttc cccactggt tggttttcag ttatatggat 840  
 gatgtggtat tgggggcca gtctgtacag catcttgagt ccctttttac cgctgttacc 900  
 30 aattttcttt tgtctttggg tatacattta acccctaaca aaacaaagag atgggggttac 960  
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 35 atactaaaaa tcaaagattg ttt 1043

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 <211> 258  
 <212> PRT  
 40 <213> hepatitis B virus

<400> 20

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55 Asn Pro His Asn Thr Ala Glu Ser Arg Leu Val Val Asp Phe Ser Gln  
 35 40 45

Phe Ser Arg Gly Asn Tyr Arg Val Ser Trp Pro Lys Phe Ala Val Pro  
 50 55 60

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5      Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asp Leu Ser Trp Leu  
        65                                 70                                 75                                 80  
        Ser Leu Asp Val Ser Ala Ala Phe Tyr His Ile Pro Leu His Pro Ala  
    85                                 90                                 95  
 10      Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr Val  
    100                                 105                                 110  
 15      Ala Arg Leu Ser Ser Asn Ser Arg Ile Leu Asn His Gln His Gly Asn  
    115                                 120                                 125  
 20      Met Pro Asn Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu  
    130                                 135                                 140  
 25      Leu Leu Leu Tyr Gln Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His  
    145                                 150                                 155                                 160  
        Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser  
    165                                 170                                 175  
 30      Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg  
    180                                 185                                 190  
 35      Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val  
    195                                 200                                 205  
 40      Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Phe Thr Ala Val  
    210                                 215                                 220  
 45      Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Thr Pro Asn Lys Thr  
    225                                 230                                 235                                 240  
        Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser  
    245                                 250                                 255  
 50      Tyr Gly  
 55      <210> 21  
        <211> 226  
        <212> PRT

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&lt;213&gt; hepatitis B virus

&lt;400&gt; 21

5 Met Glu Asn Ile Thr Ser Gly Leu Leu Gly Pro Leu Leu Val Leu Gln  
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 10 Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu  
 20 25 30  
 15 Asp Ser Trp Trp Thr Ser Leu Ser Phe Leu Gly Gly Thr Thr Val Cys  
 35 40 45  
 Leu Gly Gln Asn Ser Arg Ser Pro Thr Ser Asn His Ser Pro Thr Ser  
 50 55 60  
 20 Cys Pro Pro Thr Cys Pro Gly Tyr Arg Trp Met Tyr Leu Arg Arg Phe  
 65 70 75 80  
 25 Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val  
 85 90 95  
 30 Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly  
 100 105 110  
 35 Ser Ser Thr Thr Ser Thr Gly Thr Cys Arg Thr Cys Thr Thr Pro Ala  
 115 120 125  
 Gln Gly Thr Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp  
 130 135 140  
 40 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys  
 145 150 155 160  
 45 Phe Leu Trp Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu Leu  
 165 170 175  
 50 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu  
 180 185 190  
 Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Ser Ile  
 195 200 205  
 55 Leu Ser Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val



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	210	215	220	
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	225			
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	<211> 1027			
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	aagatcccag agtgagaggc ctgtatttcc ctgctggtgg ctccagttca ggaacagtaa		180	
20	accctgttcc gaccactgcc tctcccttat cgtcaatctt ctcgaggatt ggggaccctg		240	
	cgctgaacat ggagaacatc acatcaggat tcctaggacc ctttctcgtg ttacaggcgg		300	
25	ggtttttctt gttgacaaga atcctcacia taccgcagag tctagactcg tgggtgactt		360	
	ctctcagttt tctaggggaa accaccgtgt gtcttggcca aaattcgcag tccccaacct		420	
	ccaatcactc accaacctcc tgtcctccaa cttgtcctgg ttatcgctgg atgtgtctgc		480	
30	ggcgttttat catattcctc ttcattcctgc tgctatgcct catcttcttg ttggttcttc		540	
	tggactatca aggtatgttg ccogtttgtc ctctaattcc aggatcctca accaccagca		600	
35	cgggaccatg ccgaacctgc acgactcctg ctcaaggaac ctctatgtat cctcctctgtt		660	
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	tgcgaaaatt cctatgggag tggggctcag ccggtttctc atggctcagt ttactagtgc		780	
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	tgtgggtattg ggggccaagt ctgtatcgca tcttgagtcc cttttaccg ctgttaccaa		900	
45	ttttcttttg tctttgggta tacatttaaa ccctaacaaa acgaaaagat ggggttactc		960	
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	<213> hepatitis B virus			
55	<400> 23			

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5	Pro	Arg	Thr	Pro	Ser	Arg	Val	Thr	Gly	Gly	Val	Phe	Leu	Val	Asp	Lys	
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10	Asn	Pro	His	Asn	Thr	Ala	Glu	Ser	Arg	Leu	Val	Val	Asp	Phe	Ser	Gln	
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20	Asn	Leu	Gln	Ser	Leu	Thr	Asn	Leu	Leu	Ser	Ser	Asn	Leu	Ser	Trp	Leu	
	65					70					75					80	
25	Ala	Met	Pro	His	Leu	Leu	Val	Gly	Ser	Ser	Gly	Leu	Ser	Arg	Tyr	Val	
				100					105					110			
30	Ala	Arg	Leu	Ser	Ser	Asn	Ser	Arg	Ile	Leu	Asn	His	Gln	His	Gly	Thr	
			115					120					125				
35	Met	Pro	Asn	Leu	His	Asp	Ser	Cys	Ser	Arg	Asn	Leu	Tyr	Val	Ser	Leu	
		130					135					140					
40	Leu	Leu	Leu	Tyr	Gln	Thr	Phe	Gly	Arg	Lys	Leu	His	Leu	Tyr	Ser	His	
	145					150					155					160	
45	Pro	Ile	Ile	Leu	Gly	Phe	Arg	Lys	Ile	Pro	Met	Gly	Val	Gly	Leu	Ser	
					165					170					175		
50	Arg	Ala	Phe	Pro	His	Cys	Leu	Ala	Phe	Ser	Tyr	Val	Asp	Asp	Val	Val	
			195					200					205				
55	Leu	Gly	Ala	Lys	Ser	Val	Ser	His	Leu	Glu	Ser	Leu	Phe	Thr	Ala	Val	
		210					215					220					
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225                                      230                                      235                                      240  
 5    Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Cys  
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 <210> 24  
 <211> 226  
 <212> PRT  
 15 <213> hepatitis B virus  
  
 <400> 24  
  
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 Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu  
 25                                      20                                      25                                      30  
  
 Asp Ser Trp Trp Thr Ser Leu Ser Phe Leu Gly Glu Thr Thr Val Cys  
      35                                      40                                      45  
 30  
 Leu Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser  
      50                                      55                                      60  
 35 Cys Pro Pro Thr Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe  
      65                                      70                                      75                                      80  
 40 Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val  
      85                                      90                                      95  
  
 Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly  
 45                                      100                                      105                                      110  
  
 Ser Ser Thr Thr Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala  
      115                                      120                                      125  
 50  
 Gln Gly Thr Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp  
      130                                      135                                      140  
 55 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Lys  
      145                                      150                                      155                                      160

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	Phe	Leu	Trp	Glu	Trp	Gly	Ser	Ala	Arg	Phe	Ser	Trp	Leu	Ser	Leu	Leu	
					165					170					175		
5	Val	Pro	Phe	Val	Gln	Trp	Phe	Val	Gly	Leu	Ser	Pro	Thr	Val	Trp	Leu	
				180					185					190			
10	Ser	Val	Met	Trp	Met	Met	Trp	Tyr	Trp	Gly	Pro	Ser	Leu	Tyr	Arg	Ile	
			195					200					205				
15	Leu	Ser	Pro	Phe	Leu	Pro	Leu	Leu	Pro	Ile	Phe	Phe	Cys	Leu	Trp	Val	
		210					215					220					
	Tyr	Ile															
	225																
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	tgct	caagg	aac	ctct	atg	tat	ccct	cat	gtt	g	ctgt	tac	caa	ac	ctt	c	240
35	gcac	ctgt	at	tcc	at	ccca	tcat	c	ctgg	g	cttt	c	gaa	aa	att	c	300
	cag	cc	gtt	ct	at	gg	ctc	ag	ttt	act	ag	tg	cc	att	tgt	tc	360
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	aa	ac	ct	c	ac	aaa	ac	aaaa	gat	g	ggg	gtta	ct	ct	tt	ac	540
45	at	gt	t	at	g	g	g	g	gtta	ct	ct	tt	ac	at	tt	cat	560
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50	<211>	186															
	<212>	PRT															
	<213>	hepatitis B virus															
	<400>	26															
55	Asn	Leu	Ser	Trp	Leu	Ser	Leu	Asp	Val	Ser	Ala	Ala	Phe	Tyr	His	Ile	
	1				5					10					15		

- 29 -

```

5      Pro Leu His Pro Ala Ala Met Pro His Leu Leu Val Gly Ser Ser Gly
      20                                25                                30

      Leu Ser Arg Tyr Val Ala Arg Leu Ser Ser Thr Ser Arg Ile Phe Asn
      35                                40                                45

10     His Gln His Gly Ser Met Gln Asn Leu His Asp Ser Cys Ser Arg Asn
      50                                55                                60

15     Leu Tyr Val Ser Leu Met Leu Leu Tyr Gln Thr Phe Gly Arg Lys Leu
      65                                70                                75                                80

20     His Leu Tyr Ser His Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met
      85                                90                                95

      Gly Val Gly Leu Ser Pro Phe Leu Met Ala Gln Phe Thr Ser Ala Ile
      100                                105                                110

25     Cys Ser Val Val Arg Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr
      115                                120                                125

30     Val Asp Asp Val Val Leu Gly Ala Lys Ser Val Ser His Leu Glu Ser
      130                                135                                140

35     Leu Phe Thr Ala Val Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu
      145                                150                                155                                160

40     Asn Pro His Lys Thr Lys Arg Trp Gly Tyr Ser Leu His Phe Met Gly
      165                                170                                175

      Tyr Val Ile Gly Cys Tyr Gly Ser Leu Pro
      180                                185

45     <210> 27
      <211> 160
      <212> PRT
50     <213> hepatitis B virus

      <220>
      <221> MISC_FEATURE
      <222> (160)..(160)
55     <223> Xaa is any amino acid

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&lt;400&gt; 27

Thr Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe Ile Ile Phe  
 1 5 10 15  
 5 Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val Leu Leu Asp  
 20 25 30  
 10 Tyr Arg Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly Ser Ser Thr  
 35 40 45  
 15 Thr Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala Gln Gly Thr  
 50 55 60  
 20 Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys  
 65 70 75 80  
 Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp  
 85 90 95  
 25 Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu Leu Val Pro Phe  
 100 105 110  
 30 Val Gln Trp Phe Val Gly Leu Ser Pro Ile Val Trp Leu Ser Val Met  
 115 120 125  
 35 Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Arg Ile Leu Ser Pro  
 130 135 140  
 40 Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val Tyr Ile Xaa  
 145 150 155 160

&lt;210&gt; 28

&lt;211&gt; 1029

45 &lt;212&gt; DNA

&lt;213&gt; hepatitis B virus

&lt;400&gt; 28

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 tctaagagac agtcattcctc aggccatgca gtggaactcc agcacattcc accaagctct 120  
 gctagatccc aragtgagrg gctatactt tcctgctggt ggctccagtt ccggaacagt 180  
 55 aaaccctggt ccgactactg cctctcccat atcgtcaatc ttctcgagga ctggggaccc 240  
 tgcaccgaat atggagagca caacatcagg attcctagga ccctgctcg tggttacaggc 300

- 31 -

ggggtttttc ttgttgacaa gaatcctcac aataccacag agtctagact cgtggtggac 360  
 5 ttctctcaat tttctagggg gagcaccac gtgtcctggc caaaatttgc agtccccaac 420  
 ctccaatcac tcaccaacct cttgtcctcc aatttgtcct gggtatcgct ggatgtgtct 480  
 ggggcgtttt atcatcttcc tcttcatcct gctgctatgc ctcatcttct tgtkggttct 540  
 10 tctggactac caaggatatgt tgcccgtttg tcctctactt ccaggaacat caactaccag 600  
 cacgggacca tgcaagacct gcacgattcc tgctcaagga acctctatgt ttccctcttg 660  
 15 ttgctgtaca aaaccttcgg acggaaattg cacttgtatt cccatcccat catcttgggc 720  
 tttcgcaaga ttcctatggg agtgggcctc agtcogtttc tcctggctca gtttactagt 780  
 gccatttggt cagtggttcg tagggcttcc cccactgtt tggctttcag ttatatggat 840  
 20 gatgtgggtat tgggggcaa gtctgtacaa catcttgaat ccctttttac cgctgttacc 900  
 aattttcttt tgtctttggg tatacattta aaccctacta aaactaaacg ttggggctac 960  
 25 tcccttaact tcatgggata tgtaattgga agttggggta ccttaccaca ggaacatatt 1020  
 gtacacaaa 1029

<210> 29  
 30 <211> 268  
 <212> PRT  
 <213> hepatitis B virus

<400> 29  
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1				5					10					15	

40 Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys

			20					25					30		
--	--	--	----	--	--	--	--	----	--	--	--	--	----	--	--

45 Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp Phe Ser Gln

			35					40					45		
--	--	--	----	--	--	--	--	----	--	--	--	--	----	--	--

50 Phe Ser Arg Gly Ser Thr His Val Ser Trp Pro Lys Phe Ala Val Pro

			50				55				60				
--	--	--	----	--	--	--	----	--	--	--	----	--	--	--	--

55 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu

			65			70			75				80		
--	--	--	----	--	--	----	--	--	----	--	--	--	----	--	--

Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala

				85				90					95		
--	--	--	--	----	--	--	--	----	--	--	--	--	----	--	--

- 32 -

5      Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val  
                                  100                                   105                                   110

10      Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln His Gly Thr  
                                  115                                   120                                   125

15      Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu  
                                  130                                   135                                   140

20      Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His  
                                  145                                   150                                   155                                   160

25      Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser  
                                  165                                   170                                   175

30      Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg  
                                  180                                   185                                   190

35      Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val  
                                  195                                   200                                   205

40      Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Phe Thr Ala Val  
                                  210                                   215                                   220

45      Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Thr Lys Thr  
                                  225                                   230                                   235                                   240

50      Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser  
                                  245                                   250                                   255

55      Trp Gly Thr Leu Pro Gln Glu His Ile Val His Lys  
                                  260                                   265

<210> 30  
 <211> 226  
 <212> PRT  
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 <220>  
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 <222> (95)..(95)  
 <223> Xaa is any amino acid



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&lt;400&gt; 30

5 Met Glu Ser Thr Thr Ser Gly Phe Leu Gly Pro Leu Leu Val Leu Gln  
 1 5 10 15  
 Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu  
 20 25 30  
 10 Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Ala Pro Thr Cys  
 35 40 45  
 15 Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser  
 50 55 60  
 20 Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe  
 65 70 75 80  
 Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Xaa Val  
 85 90 95  
 25 Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly  
 100 105 110  
 30 Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Ile Pro Ala  
 115 120 125  
 35 Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp  
 130 135 140  
 40 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Arg  
 145 150 155 160  
 Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser Leu Leu  
 165 170 175  
 45 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu  
 180 185 190  
 50 Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile  
 195 200 205  
 55 Leu Asn Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val  
 210 215 220

- 34 -

Tyr Ile  
225

5

<210> 31  
<211> 1035  
<212> DNA  
<213> hepatitis B virus

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tagatcccag agtgagggggc ctatactttc ctgctgggtgg ctccagttca ggaacagtaa 180

accctgttcc gactactgcc tctcccatat cgtcaatctt ctgaggagact ggggaccctg 240

20

caccgaatat ggagagcacc acatcaggat tcctaggacc cctgctcgtg ttacaggcgg 300

ggtttttctt gttgacaaga atcctcacia taccacagag tctagactcg tgggtggactt 360

25

ctctcaattt tctaggggga gcacccacgt gtccctggcca aaatttgcag tccccaacct 420

ccaatcactc accaacctct tgtcctccaa tttgtcctgg ttatcgctgg atgtgtctgc 480

ggcgttttat catcttctc ttcatacctgc tgctatgcct catcttcttg ttgggttcttc 540

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tggactacca aggtatgttg cccgtttgtc ctctacttcc aggaacatca actaccagca 600

cgggaccatg caagacctgc acgattcctg ctcaaggaac ctctatgttt cccctcttggt 660

35

gctgtacaaa accttcggac ggaaattgca cttgtattcc catcccatca tcttgggcctt 720

tcgcaagatt cctatgggag tgggcctcag tccgtttctc ctggctcagt ttactagtgc 780

catttgttca gtggttcgta gggctttccc ccaactgttg gctttcagtt atatggatga 840

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tgtgggtattg ggggccaagt ctgtacaaca tcttgaatcc ctttttaccg ctgttaccaa 900

ttttcttttg tctttgggta tacatttaaa ccttrctaaa accaaacgtt ggggttactc 960

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ccttaacttc atgggatatg taattggaag ttgggggtacc ttaccacagg aacatattgt 1020

acacaaaatc aaaca 1035

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<211> 344  
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<220>  
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<223> Xaa is any amino acid

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&lt;400&gt; 32

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 1 5 10 15  
 10 Leu Ser Thr Ser Lys Arg Gln Ser Ser Ser Gly His Ala Val Glu Leu  
 20 25 30  
 15 Gln His Ile Pro Pro Ser Ser Ala Arg Ser Gln Ser Glu Gly Pro Ile  
 35 40 45  
 20 Leu Ser Cys Trp Trp Leu Gln Phe Arg Asn Ser Lys Pro Cys Ser Asp  
 50 55 60  
 25 Tyr Cys Leu Ser His Ile Val Asn Leu Leu Glu Asp Trp Gly Pro Cys  
 65 70 75 80  
 30 Thr Glu Tyr Gly Glu His His Ile Arg Ile Pro Arg Thr Pro Ala Arg  
 85 90 95  
 35 Val Thr Gly Gly Val Phe Leu Val Asp Lys Asn Pro His Asn Thr Thr  
 100 105 110  
 40 Glu Ser Arg Leu Val Val Asp Phe Ser Gln Phe Ser Arg Gly Ser Thr  
 115 120 125  
 45 His Val Ser Trp Pro Lys Phe Ala Val Pro Asn Leu Gln Ser Leu Thr  
 130 135 140  
 50 Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu Ser Leu Asp Val Ser Ala  
 145 150 155 160  
 55 Ala Phe Tyr His Leu Pro Leu His Pro Ala Ala Met Pro His Leu Leu  
 165 170 175  
 Val Gly Ser Ser Gly Leu Pro Arg Tyr Val Ala Arg Leu Ser Ser Thr  
 180 185 190  
 Ser Arg Asn Ile Asn Tyr Gln His Gly Thr Met Gln Asp Leu His Asp  
 195 200 205  
 Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu Leu Leu Leu Tyr Lys Thr

- 36 -

	210		215		220
5	Phe Gly Arg Lys Leu His Leu Tyr Ser His Pro Ile Ile Leu Gly Phe				
	225		230		235 240
10	Arg Lys Ile Pro Met Gly Val Gly Leu Ser Pro Phe Leu Leu Ala Gln				
		245		250	255
15	Phe Thr Ser Ala Ile Cys Ser Val Val Arg Arg Ala Phe Pro His Cys				
		260		265	270
20	Leu Ala Phe Ser Tyr Met Asp Asp Val Val Leu Gly Ala Lys Ser Val				
		275		280	285
25	Gln His Leu Glu Ser Leu Phe Thr Ala Val Thr Asn Phe Leu Leu Ser				
		290		295	300
30	Leu Gly Ile His Leu Asn Pro Xaa Lys Thr Lys Arg Trp Gly Tyr Ser				
		305		310	315 320
35	Leu Asn Phe Met Gly Tyr Val Ile Gly Ser Trp Gly Thr Leu Pro Gln				
		325		330	335
40	Glu His Ile Val His Lys Ile Lys				
		340			
45	<210> 33				
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	<213> hepatitis B virus				
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	<223> Xaa is any amino acid				
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	<222> (327)..(327)				
	<223> Xaa is any amino acid				
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55	Pro Pro Ala Ser Thr Asn Arg Gln Ser Gly Arg Gln Pro Thr Pro Ile				
	1		5		10 15

- 37 -

Ser Pro Pro Leu Arg Asp Ser His Pro Gln Ala Met Gln Trp Asn Ser  
 20 25 30  
 5 Ser Thr Phe His Gln Ala Leu Leu Asp Pro Arg Val Arg Gly Leu Tyr  
 35 40 45  
 10 Phe Pro Ala Gly Gly Ser Ser Ser Gly Thr Val Asn Pro Val Pro Thr  
 50 55 60  
 15 Thr Ala Ser Pro Ile Ser Ser Ile Phe Ser Arg Thr Gly Asp Pro Ala  
 65 70 75 80  
 Pro Asn Met Glu Ser Thr Thr Ser Gly Phe Leu Gly Pro Leu Leu Val  
 85 90 95  
 20 Leu Gln Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln  
 100 105 110  
 25 Ser Leu Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Ala Pro  
 115 120 125  
 30 Thr Cys Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro  
 130 135 140  
 35 Thr Ser Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg  
 145 150 155 160  
 Arg Phe Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu  
 165 170 175  
 40 Leu Val Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu  
 180 185 190  
 45 Pro Gly Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Ile  
 195 200 205  
 50 Pro Ala Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro  
 210 215 220  
 55 Ser Asp Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe  
 225 230 235 240

- 38 -

Ala Arg Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser  
245 250 255

5 Leu Leu Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val  
260 265 270

10 Trp Leu Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr  
275 280 285

15 Asn Ile Leu Asn Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu  
290 295 300

Trp Val Tyr Ile Xaa Thr Leu Leu Lys Pro Asn Val Gly Val Thr Pro  
305 310 315 320

20 Leu Thr Ser Trp Asp Met Xaa Leu Glu Val Gly Val Pro Tyr His Arg  
325 330 335

25 Asn Ile Leu Tyr Thr Lys Ser Asn  
340

30 <210> 34  
<211> 980  
<212> DNA  
<213> hepatitis B virus

35 <400> 34  
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tactttcctg ctggtggctc cagttcagga acagtgagcc ctgctcagaa tactgcctct 180  
40 gccatatcgt caacotttctc gaagactggg gaccctgtac cgaacatgga gaacatcgca 240  
tcaggactcc taggaccctt gctcgcgtta caggcggggg ttttctcggt gacaaaaatc 300  
45 ctcaacaatac cacagagtct agactcgtgg tggacttctc tcaattttct agggggaaca 360  
cccgtgtgtc ttggccaaaa ttgcgagtcc caaatctcca gtcactcacc aacttggtgt 420  
cctccaattt gtcttggtta tcgctggatg tgtctgcggc gttttatcat cttcctctgc 480  
50 atcctgctgc tatgcctcat cttcttggtg gttcttctgg actatcaagg tatgttgccc 540  
gtttgtctc taattccagg atcatcaacc accagcaccg gaccatgcag aacctgcacg 600  
55 actcctgctc aaggaacctc tatgtttccc tcatgttgct gtacaaaacc tacggacgga 660  
aactgcacct gtattcccat cccatcatct tgggctttcg caaaatacct atgggagtg 720

- 39 -

gcctcagtc cc gtttctcttg gctcagttta ctagtgccgt ttgttcagtg gttcgtaggg 780

5 ctttccccca ctgtctggct ttcagttata tggatgatgt ggtattgggg gccaaagtctg 840

tacaacatct tgagtccctt tatgccgctg ttaccaattt tcttttgtct ttgggtatac 900

atntaaaccc tcacaaaaca aaaagatggg gatattccct tcaattcatg ggatatgtaa 960

10 ttggggggttg gggctccttg 980

<210> 35

<211> 258

15 <212> PRT

<213> hepatitis B virus

<400> 35

20 Glu Asp Trp Gly Pro Cys Thr Glu His Gly Glu His Arg Ile Arg Thr

1 5 10 15

25 Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys

20 25 30

30 Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp Phe Ser Gln

35 40 45

Phe Ser Arg Gly Asn Thr Arg Val Ser Trp Pro Lys Phe Ala Val Pro

50 55 60

35 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu

65 70 75 80

40 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala

85 90 95

45 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr Val

100 105 110

50 Ala Arg Leu Ser Ser Asn Ser Arg Ile Ile Asn His Gln His Arg Thr

115 120 125

Met Gln Asn Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu

130 135 140

55 Met Leu Leu Tyr Lys Thr Tyr Gly Arg Lys Leu His Leu Tyr Ser His

145 150 155 160

- 40 -

5	Pro	Ile	Ile	Leu	Gly	Phe	Arg	Lys	Ile	Pro	Met	Gly	Val	Gly	Leu	Ser
					165					170					175	
10	Pro	Phe	Leu	Leu	Ala	Gln	Phe	Thr	Ser	Ala	Val	Cys	Ser	Val	Val	Arg
				180					185					190		
15	Arg	Ala	Phe	Pro	His	Cys	Leu	Ala	Phe	Ser	Tyr	Met	Asp	Asp	Val	Val
			195					200					205			
20	Leu	Gly	Ala	Lys	Ser	Val	Gln	His	Leu	Glu	Ser	Leu	Tyr	Ala	Ala	Val
		210					215					220				
25	Thr	Asn	Phe	Leu	Leu	Ser	Leu	Gly	Ile	His	Leu	Asn	Pro	His	Lys	Thr
	225					230					235					240
30	Lys	Arg	Trp	Gly	Tyr	Ser	Leu	Gln	Phe	Met	Gly	Tyr	Val	Ile	Gly	Gly
					245					250					255	
35	Trp	Gly														
40	<210>	36														
	<211>	226														
	<212>	PRT														
	<213>	hepatitis B virus														
45	<400>	36														
50	Met	Glu	Asn	Ile	Ala	Ser	Gly	Leu	Leu	Gly	Pro	Leu	Leu	Ala	Leu	Gln
	1				5					10					15	
55	Ala	Gly	Phe	Phe	Ser	Leu	Thr	Lys	Ile	Leu	Thr	Ile	Pro	Gln	Ser	Leu
				20					25					30		
60	Asp	Ser	Trp	Trp	Thr	Ser	Leu	Asn	Phe	Leu	Gly	Gly	Thr	Pro	Val	Cys
			35					40					45			
65	Leu	Gly	Gln	Asn	Ser	Gln	Ser	Gln	Ile	Ser	Ser	His	Ser	Pro	Thr	Cys
		50					55					60				
70	Cys	Pro	Pro	Ile	Cys	Pro	Gly	Tyr	Arg	Trp	Met	Cys	Leu	Arg	Arg	Phe
	65					70					75					80



- 41 -

Ile Ile Phe Leu Cys Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val  
85 90 95

5 Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly  
100 105 110

10 Ser Ser Thr Thr Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala  
115 120 125

15 Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Thr Asp  
130 135 140

Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Lys  
145 150 155 160

20 Tyr Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser Leu Leu  
165 170 175

25 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu  
180 185 190

30 Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile  
195 200 205

35 Leu Ser Pro Phe Met Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val  
210 215 220

Tyr Ile  
225

40 <210> 37  
<211> 900  
<212> DNA  
<213> hepatitis B virus

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50 tegtcaatct tctcgaggat tggggaccct gcgctgaaca tggagaacat cacatcagga 120

ttcctaggac cccttctcgt gttacaggcg gggtttttct tgttgacaag aatcctcaca 180

ataccgcaga gtctagactc gtggtggact tctctcaatt ttcgaggggg aactaccgtg 240

55 tgtcttggcc aaaattcgca gtccccaacc tccaatcact caccaacctc ctgtcctcca 300

acttgctctg gttatcgctg gatgtgtctg cggcgtttta tcatmttctt cttcatcctg 360

- 42 -

ctgctatgcc tcactcttctt gttgggttctt ctggactatc raggtatggt gcccgtttgt 420  
 5 cctctaattc caggatcctc awccaccagc acgggaccat gccgaacctg catgactact 480  
 gctcaaggaa cctctatgta tccctcctgt tgctgtacca aacctacgga cggaaattgc 540  
 acctgtattc ccatcccatc atcctgggct ttcggaat tcttatggga gtgggcctca 600  
 10 gcccgtttct cctggctcag ttacttagtg ccatttggtc agtggttcgt agggctttcc 660  
 cccactgttt ggctttcagt tatatggatg atgtggtatt gggggccaag tctgtaymgc 720  
 15 atcttgagtc cctttttacc gctgttacca attttctttt gtctttgggt atacatttaa 780  
 accctaacaa aacaaagaga tgggggttact ctctgaattt tatgggttat gtcattggaa 840  
 gttatgggtc cttgccacaa gaacacatca tacaaaaaat caaagaatgt tttagaaaac 900  
 20  
 <210> 38  
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 <222> (115)..(115)  
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 <222> (147)..(147)  
 35 <223> n=any nucleotide  
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 40 <222> (239)..(239)  
 <223> n=any nucleotide  
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 45  
 Cys Trp Trp Leu Gln Phe Arg Asn Ser Lys Pro Cys Ser Asp Tyr Cys  
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 50 Leu Ser Leu Ile Val Asn Leu Leu Glu Asp Trp Gly Pro Cys Ala Glu  
 20 25 30  
 55 His Gly Glu His His Ile Arg Ile Pro Arg Thr Pro Ser Arg Val Thr  
 35 40 45

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Gly Gly Val Phe Leu Val Asp Lys Asn Pro His Asn Thr Ala Glu Ser  
 50 55 60

5 Arg Leu Val Val Asp Phe Ser Gln Phe Ser Arg Gly Asn Tyr Arg Val  
 65 70 75 80

10 Ser Trp Pro Lys Phe Ala Val Pro Asn Leu Gln Ser Leu Thr Asn Leu  
 85 90 95

15 Leu Ser Ser Asn Leu Ser Trp Leu Ser Leu Asp Val Ser Ala Ala Phe  
 100 105 110

Tyr His Xaa Pro Leu His Pro Ala Ala Met Pro His Leu Leu Val Gly  
 115 120 125

20 Ser Ser Gly Leu Ser Arg Tyr Val Ala Arg Leu Ser Ser Asn Ser Arg  
 130 135 140

25 Ile Leu Xaa His Gln His Gly Thr Met Pro Asn Leu His Asp Tyr Cys  
 145 150 155 160

30 Ser Arg Asn Leu Tyr Val Ser Leu Leu Leu Leu Tyr Gln Thr Tyr Gly  
 165 170 175

35 Arg Lys Leu His Leu Tyr Ser His Pro Ile Ile Leu Gly Phe Arg Lys  
 180 185 190

40 Ile Pro Met Gly Val Gly Leu Ser Pro Phe Leu Leu Ala Gln Phe Thr  
 195 200 205

Ser Ala Ile Cys Ser Val Val Arg Arg Ala Phe Pro His Cys Leu Ala  
 210 215 220

45 Phe Ser Tyr Met Asp Asp Val Val Leu Gly Ala Lys Ser Val Xaa His  
 225 230 235 240

50 Leu Glu Ser Leu Phe Thr Ala Val Thr Asn Phe Leu Leu Ser Leu Gly  
 245 250 255

55 Ile His Leu Asn Pro Asn Lys Thr Lys Arg Trp Gly Tyr Ser Leu Asn  
 260 265 270

Phe Met Gly Tyr Val Ile Gly Ser Tyr Gly Ser Leu Pro Gln Glu His

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275 280 285

5 Ile Ile Gln Lys Ile Lys Glu Cys Phe Arg Lys  
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35 40 45

45 Gln Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser  
50 55 60

50 Leu Asp Ser Trp Trp Thr Ser Leu Asn Phe Arg Gly Gly Thr Thr Val  
65 70 75 80

55 Cys Leu Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr  
85 90 95

Ser Cys Pro Pro Thr Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg

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5	Phe Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu 115 120 125			
10	Val Leu Leu Asp Tyr Xaa Gly Met Leu Pro Val Cys Pro Leu Ile Pro 130 135 140			
15	Gly Ser Ser Xaa Thr Ser Thr Gly Pro Cys Arg Thr Cys Met Thr Thr 145 150 155 160			
20	Ala Gln Gly Thr Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Thr 165 170 175			
25	Asp Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly 180 185 190			
30	Lys Phe Leu Trp Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu 195 200 205			
35	Leu Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp 210 215 220			
40	Leu Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Xaa 225 230 235 240			
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180	gaacatggag aacatcacat caggattcct aggaccctt ctcggtgttac aggcgggggtt			180
240	tttcttggtg acaagaatcc tcacaatacc gcagagtcta gactcgtggt ggacttctct			240

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 tcaactcacca acctcctgtc ctccaacttg tcttggttat cgctggatgt gtctgcggcg 360  
 5 ttttatcatc ttctcttca tctgtgtgt atgcctcatc ttcttggttg ttcttctgga 420  
 ctatcraggt atgttgcccg ttgtcctct aattccagga tcctcaacca ccagcacggg 480  
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 15 tgttcagtgg ttcgtagggc tttccccac tgtttggctt tcagttatat ggatgatgtg 720  
 gtattggggg ccaagtctgy acagcatctt gagtcccttt ttaccgcggt gaccaatttt 780  
 20 cttttgtctt tgggtataca tttaaacct aacaaaacaa agagatgggg ttactctctg 840  
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 45 Leu Glu Asp Trp Gly Pro Cys Ala Glu His Gly Glu His His Ile Arg  
 35 40 45  
 50 Ile Pro Arg Thr Pro Ser Arg Val Thr Gly Gly Val Phe Leu Val Asp  
 50 55 60  
 55 Lys Asn Pro His Asn Thr Ala Glu Ser Arg Leu Val Val Asp Phe Ser  
 65 70 75 80

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Gln Phe Ser Arg Gly Asn Tyr Arg Val Ser Trp Pro Lys Phe Ala Val  
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 5 Pro Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp  
 100 105 110  
 10 Leu Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro  
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 15 Ala Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr  
 130 135 140  
 20 Val Ala Arg Leu Ser Ser Asn Ser Arg Ile Leu Asn His Gln His Gly  
 145 150 155 160  
 25 Thr Met Pro Asn Leu His Asp Tyr Cys Ser Arg Asn Leu Tyr Val Ser  
 165 170 175  
 30 Leu Leu Leu Leu Tyr Gln Thr Tyr Gly Arg Lys Leu His Leu Tyr Ser  
 180 185 190  
 35 His Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu  
 195 200 205  
 40 Ser Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val  
 210 215 220  
 45 Arg Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val  
 225 230 235 240  
 50 Val Leu Gly Ala Lys Ser Xaa Gln His Leu Glu Ser Leu Phe Thr Ala  
 245 250 255  
 55 Val Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Asn Lys  
 260 265 270  
 50 Thr Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly  
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 40 Asn Phe Leu Gly Gly Thr Thr Val Cys Leu Gly Gln Asn Ser Gln Ser  
 85 90 95  
 45 Pro Thr Ser Asn His Ser Pro Thr Ser Cys Pro Pro Thr Cys Pro Gly  
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 Tyr Arg Trp Met Cys Leu Arg Arg Phe Ile Ile Phe Leu Phe Ile Leu  
 115 120 125  
 50 Leu Leu Cys Leu Ile Phe Leu Leu Val Leu Leu Asp Tyr Xaa Gly Met  
 130 135 140  
 55 Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr Thr Ser Thr Gly  
 145 150 155 160



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10	Ser	Cys	Cys	Cys 180	Thr	Lys	Pro	Thr	Asp 185	Gly	Asn	Cys	Thr	Cys 190	Ile	Pro
15	Ile	Pro	Ser 195	Ser	Trp	Ala	Phe	Gly 200	Lys	Phe	Leu	Trp	Glu 205	Trp	Ala	Ser
20	Ala	Arg 210	Phe	Ser	Trp	Leu	Ser 215	Leu	Leu	Val	Pro	Phe 220	Val	Gln	Trp	Phe
25	Val 225	Gly	Leu	Ser	Pro	Thr 230	Val	Trp	Leu	Ser	Val 235	Ile	Trp	Met	Met	Trp 240
30	Tyr	Trp	Gly	Pro	Ser 245	Leu	Xaa	Ser	Ile	Leu 250	Ser	Pro	Phe	Leu	Pro 255	Arg
35	Pro	Ile	Phe	Phe 260	Cys	Leu	Trp	Val	Tyr 265	Ile						